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CONTENTS:

Cladonia ecmocyna in North America. *Alexander W. Evans*... 261
Perlustrationes Plantarum Arcticarum IV. *Nicholas Polunin*. .. 271
Uses of Cellulose Acetate in the Herbarium. *Norman C. Fassett*. 286
The Effect of Forced Aeration on the Longevity of Laminaria. *John W. King*. 288
A Further Note on the Plants of Vinland the Good. *Henry K. Svenson*. 289
Antennaria rosea Greene in the Lake Superior Region. *Peter A. Hyypio*. 291
The White Form of the Fringed Polygala in New Hampshire. *Richard A. Howard*. 292

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THE NEW ENGLAND BOTANICAL CLUB

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CLADONIA ECMOCYNA IN NORTH AMERICA[1]

ALEXANDER W. EVANS

DURING the summer of 1951 important collections of lichens were made by Dr. I. Mackenzie Lamb in Alberta and British Columbia. In these collections the *Cladoniae* are well represented, and one of the most striking species among them is the controversial *C. ecmocyna* (Ach.) Nyl. Since this species has been confused with *C. gracilis* (L.) Willd., the writer has reexamined and subjected to microchemical tests a series of North American specimens in the Yale Herbarium which had been referred to *C. gracilis.* It soon became apparent that a number of these specimens, particularly among those from Alaska and the Rocky Mountain region, represented *C. ecmocyna,* rather than *C. gracilis,* and that the geographical range of *C. ecmocyna* in North America was more extensive than had been supposed. The specimens in question (with the exception of those from Greenland and the Aleutian Islands) are listed in the present report, following a history of the species and a discussion of its characteristic features.

CLADONIA ECMOCYNA (Ach.) Nyl. Notis. Sällsk. F. et Fl. Fennica Förhandl. **8:** 176. 1866. *Cenomyce ecmocyna* Ach. in part, Lich. Univ. 549. 1810. *Cladonia gracilis* η. *elongata* *f. *ecmocyna* Vainio, Acta Soc. F. et Fl. Fennica **10:** 469. 1894. *C. gracilis* var. *elongata* m. *ecmocyna* Vainio, *Ibid.* **14:** 251. 1897. **C. elongata* f. *ecmocyna* Vainio, *Ibid.* **53:** 93. 1922. *C. gracilis* var. *ecmocyna* Vainio in Zahlbruckner, Cat. Lich. Univ. **4:** 547. 1927.

The history of *Cladonia ecmocyna* is much involved, and the claims of the species for recognition have been repeatedly questioned. Nylander, in his original account (1866, p. 176), merely stated that "*Cl. ecmocyna* (Ach. pr. p.)" should be separated from *C. gracilis* because treatment with KOH stained the podetial cortex yellow. Although he cited no synonyms he obviously based his species on some component of *Cenomyce ecmocyna* Ach., as indicated in the above synonymy. In fact he soon assigned the combination *Cladonia ecmocyna* to Acharius (1867, p. LV) and listed under it a var. *macroceras* Ach., in spite of the fact that Acharius had not accepted *Cladonia* as a generic name in his publications. The original *Cenomyce ecmocyna* was defined in a broad sense and included a number of elements in addition to the species now known as *Cladonia gracilis* (L.) Willd. Lichenologists, however, have associated Nylander's species definitely with *C. gracilis*, either as a closely related species or as a synonym of one of its varieties.

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[1] Contribution from the Osborn Botanical Laboratory.

According to Th. Fries, who was one of the first to comment on *Cladonia ecmocyna* (1871, p. 82), many specimens of *C. gracilis* are negative with KOH, but some specimens of *C. gracilis* "var. *macroceras*" (particularly in material from alpine or arctic localities) are stained more or less definitely yellow by this reagent; and he pointed out that such specimens had been distinguished as *C. ecmocyna* by Nylander. At the same time Fries implied that there were no sharp distinctions between KOH− and KOH+ specimens and that *C. ecmocyna*, therefore, was based on an inconstant character. Vainio, in 1880, reached similar conclusions (see 1894, p. 125) and stated that the younger parts of the podetia in *C. gracilis* were commonly stained yellow by KOH. Under *C. gracilis* *η. elongata*, however, he listed a f. *ecmocyna* (Nyl.) Vainio, as noted in the synonymy, without giving a description of this form. He supplied this three years later (1897, p. 251), when he characterized "var. *elongata* m. *ecmocyna* (Ach.)" as having glaucescent podetia, making no allusion to any color-change induced by KOH.

In 1908 Zopf reported on the lichen-substances produced by various species and varieties of *Cladonia* subgenus *Cenomyce* (Ach.) Th. Fr., using *Cenomyce* Ach. as a generic name. The results obtained by his chemical analyses of *Cenomyce gracilis* var. *chordalis* (Floerke) Schaer. and *C. gracilis* var. *elongata* (Jacq.) Vainio (under which he listed *Cenomyce ecmocyna* *γ. macroceras* Ach. as a synonym) are of special interest in their bearing on Nylander's *Cladonia ecmocyna.* According to Zopf's account the material of var. *chordalis,* which Sandstede had collected in Oldenburg, was stained more or less definitely yellow by KOH and yet contained no atronorine, the substance usually responsible for this color-change. He therefore attributed the reaction to the presence of fumarprotocetraric acid. The material of var. *elongata,* on the other hand, which he had personally collected in the mountains of Tirol at elevations of 1300 m. or above, although similarly stained yellow by KOH, contained both atronorine and fumarprotocetraric acid. Zopf had thus demonstrated, as he supposed, a chemical distinction between var. *chordalis* and var. *elongata,* although he found no definite differences in the color-changes induced by KOH.

Scriba, a few years later (1913, p. 176), disagreed with both Vainio and Zopf in regard to these color-changes and maintained that there was a difference between the distinct yellow color appearing at once in *Cladonia ecmocyna* and the brown color (as he described it) appearing gradually in *C. gracilis.* He noted further that central proliferations of the podetia were not infrequent in *C. ecmocyna,* but exceedingly rare in *C. gracilis.* On the basis of these distinctions he expressed the opinion that *C. ecmocyna* might be recognized as a valid species, except for the fact that it could not always be distinguished from *C. gracilescens* Vainio (now commonly known as *C. lepidota* Nyl.). He therefore included *C. ecmocyna* under *C. gracilescens* as a synonym and listed a specimen from Korea under the latter name. According to Scriba's account the podetia in his European material of *C. ecmocyna* either bore cups or agreed morphologically with cupless forms of *C. gracilis* var. *chordalis.* He was less definite about his North American material, although he compared a specimen from Labrador with *C. gracilis* var. *dilatata* and implied that specimens from British Columbia, Montana, and Washington were similar.

Scriba made no allusion to Zopf's chemical studies, but Vainio was strongly influenced by them. In 1922 he stated definitely that *C. gracilis* var. *chordalis* contained fumarprotocetraric acid only (p. 91), but that **C. elongata* (which he raised to subspecific rank under *C. gracilis*) contained both fumarprotocetraric acid and atronorine (p. 93). He described the color-change induced by KOH in var. *chordalis* as "luteo (demum obscuriore)" and that induced in **C. elongata* as "dilute flavescentia aut lutescentia," but the difference indicated by these phrases is less than the difference described by Scriba between *C. gracilis* and *C. ecmocyna.* As indicated in the synonymy Vainio listed a f. *ecmocyna* under **C. elongata* and still characterized it only by its glaucescent podetia.

Meanwhile Sandstede, in 1912 (p. 381), also influenced by Zopf's report, had raised *C. gracilis* var. *elongata* to specific rank, with *C. ecmocyna* as a synonym, and had listed atronorine and fumarprotocetraric acid as the characteristic lichen-substances of the species. Ten years later, however (1922, p. 207), he recognized *C. ecmocyna* as a distinct species, characterized by the same lichen-substances, and reduced *C. elongata* to varietal rank under *C. gracilis.* He thus implied that the true *C. gracilis* var. *elongata* contained no atronorine and that the so-called material of *Cenomyce gracilis* var. *elongata,* analyzed by Zopf, represented *C. ecmocyna* instead.

In 1928 Anders listed both *C. elongata* and *C. ecmocyna* as valid species, restricting their range in Central Europe to high altitudes. At the same time he emphasized the marked similarity of these species to each other. According to his statements the podetia of *C. elongata* are stained yellow by KOH in the younger parts, but remain unchanged in the older parts, whereas those of *C. ecmocyna* are stained intensely yellow throughout. Anders called attention also to the frequency of central proliferations in *C. ecmocyna* and added that the podetia were grayish green and lighter in color than those of *C. elongata.*

Sandstede, in 1931 (p. 364), again recognized *C. ecmocyna* but in 1938 (p. 66) threw doubts on its validity. After stating that Zopf's analysis of "var. *elongata*" had presumably been based on material of *C. ecmocyna,* he suggested that typical specimens of var. *elongata* should be tested for atronorine. Then, if these tests should yield positive results, the chemical distinction between *C. gracilis* and *C. ecmocyna* would break down, and the latter would have to be reduced to synonymy.

The tests suggested by Sandstede were soon made by Asahina, who reported upon them in 1943. They were based on eleven European specimens distributed by Sandstede in his *Cladoniae* exsiccatae under the name *C. gracilis* var. *elongata.* In eight of these specimens Asahina obtained negative results but was able to demonstrate the presence of atronorine in three, Nos. 714, 1132, and 1133, which he transferred to *C. ecmocyna.* He obtained positive results also with Nos. 600, 954, 1255 and 1281 of Sandstede's exsiccatae, which had been distributed under the name *C. ecmocyna.* He thus proved definitely that there was a chemical distinction between the true *C. gracilis* var. *elongata* and *C. ecmocyna* and that Zopf had based his analysis of "var. *elongata*" on material of the latter species. It is to be recommended, therefore, in distinguishing *C. ecmocyna,* that emphasis should be laid on the presence of atronorine, rather than on the more or less variable color-changes induced by KOH. It may be added that six of the specimens of *C. ecmocyna* distributed by Sandstede came from Sweden and the seventh from a high altitude in Switzerland.

Most writers on North American lichens have ignored *C. ecmocyna,* except perhaps in synonymy, but Dahl, in a report on the macrolichens of South West Greenland (1950, p. 97), accepts the species without question and characterizes it, not only by the presence of atronorine, but also by its coarse podetia, with a smoother cortex than in *C. gracilis.* According to his account *C. gracilis* is represented in Greenland by var. *chordalis* only, and all the specimens from the island, which have been determined as var. *elongata,* should be referred to *C. ecmocyna* instead. He reports the species also from Central Europe, Scandinavia, Spitzbergen, Novaya Zemlya, Kamchatka, "America," and Patagonia, on the basis of specimens which he has personally examined. Dahl emphasizes the fact that in Greenland *C. gracilis* var. *chordalis* grows on rockfalls and lichen-heaths, but that *C. ecmocyna* prefers snow fields and bogs. The two species thus differ ecologically, at least in Greenland.

Aside from the presence of atronorine in *C. ecmocyna* there is really little to distinguish the species from *C. gracilis,* and the few slight differences noted in the literature are based on inconstant characters. The differences in the dimensions and color of the podetia, for example, and in the appearance of the podetial surface are caused largely by external factors and are therefore of little significance. The occurrence of central proliferations, also, although emphasized by both Scriba and Anders, is much less frequent than they imply, and most specimens of *C. ecmocyna* lack such proliferations altogether. Even the range of variability in the two species is much the same, since some specimens of *C. ecmocyna* agree morphologically with *C. gracilis* var. *elongata*, others with *C. gracilis* var. *chordalis*, and still others with *C. gracilis* var. *dilatata.* The varieties of *C. gracilis* in their more typical development are clearly marked and amply distinct from one another; and yet some specimens of the species are less definite in their morphology and represent more or less intermediate forms. Similar, more or less indefinite, forms occur also in *C. ecmocyna.* On the whole the relation of *C. ecmocyna* to *C. gracilis* is much the same as that of *C. cryptochlorophaea* Asahina and *C. Grayi* Merrill to *C. chlorophaea* (Floerke) Spreng.

The geographical range of *C. ecmocyna* in North America, although duplicating that of *C. gracilis* to a certain extent, is more definitely northern and alpine, just as it is in Europe. In New England, for example, the only known station for *C. ecmocyna* is the summit of Mt. Katahdin in Maine, whereas specimens of *C. gracilis* have been collected from as far south as Connecticut.

The recognition of subordinate categories under *C. ecmocyna* was initiated by Nylander when he listed *C. ecmocyna* var. *macroceras* Ach. (1867, p. LV). Vainio, in 1894, referred this variety definitely to *C. gracilis* η. *elongata* as a synonym (p. 116), and it seems justifiable to retain the varietal name "*macroceras*" for specimens of *C. ecmocyna* which exhibit the morphological features of *C. gracilis* var. *elongata.*

In addition to var. *macroceras* Nylander recognized three forms of *C. ecmocyna:* f. *nigripes* and f. *contorquescens* in 1873 (see Norrlin, p. 319) and f. *gracilescens* in 1876 (see Norrlin, p. 13). According to Vainio (1894, p. 109) the original specimens of f. *nigripes* and f. *gracilescens* are referable to *C. gracilis* γ. *chordalis*, and the writer suggests retaining "*nigripes*" as a varietal name for specimens of *C. ecmocyna* with the morphological features of *C. gracilis* var. *chordalis*, since this name antedates the name "*gracilescens*" by three years. Nylander's specimens of f. *contorquescens*, according to Vainio (1894, p. 126), represent a somewhat aberrant form of *C. gracilis* η. *elongata.*

Apparently the only additional form which has been assigned in the literature to *C. ecmocyna* as a species is f. *foveata* E. Dahl, which was proposed as new in 1950 (p. 99). This form was based on specimens collected by the author at Ivigtut, Greenland, and is known only from the type-locality. Zahlbruckner, however, in the fourth volume of his catalogue (1927, p. 548), listed the following forms under *C. gracilis* var. *ecmocyna:* f. *nigriceps* (Nyl.) Zahlbr., f. *rostrata* (Ach.) Zahlbr., and f. *subdilacerata* Vainio. The first is obviously a misprint for f. "*nigripes.*" The second, under which "*C. gracilis* f. *rostrata* Ach." is cited as a synonym, is presumably based on *Cenomyce ecmocyna* *β. rostrata* Ach. (1810, p. 550), at least in part. Vainio interpreted this as a synonym of *C. gracilis* *η. elongata,* and it therefore seems safe to include Zahlbruckner's f. *rostrata* under *C. ecmocyna* var. *macroceras.*

The third form was originally described by Vainio under the name *C. gracilis* *f. *subdilacerata* (1894, p. 95) and was later cited by him as *C. gracilis* var. *elongata* f. *subdilacerata* (1897, p. 251). Both Merrill (1924, p. 25) and Sandstede (1931, p. 363), who recognized f. *subdilacerata,* included it without question under *C. gracilis* var. *elongata,* and Anders (1928, p. 99) was equally definite in including it under *C. elongata.* Under the circumstances it is perhaps wisest to leave it in this position.

The varieties *macroceras* and *nigripes* will provide for specimens of *C. ecmocyna* having the morphological features of *C. gracilis* var. *elongata* or of *C. gracilis* var. *chordalis.* Specimens with the features of var. *dilatata,* however, are still without a name. For such specimens the writer recommends the name "*intermedia,*" derived from *C. elongata* f. *intermedia* Robbins (1931, p. 137). This form was based on specimens from Wyoming, and Dr. Blake, the collector, has kindly supplied a portion of the type-material. Although Robbins associated f. *intermedia* with *C. elongata,* the podetia form cups essentially like those of *C. gracilis* var. *dilatata,* and microchemical tests reveal the presence of atronorine.

CLADONIA ECMOCYNA var. MACROCERAS (Floerke) Ach. in Nylander, Middendorff's Reise in Siberien **4:** LV. 1867. *Capitularia gracilis γ. Capitularia macroceras* Floerke, in part, Weber and Mohr's Beiträge zur Naturk. **2:** 330. 1810. *Cenomyce ecmocyna β. C. rostrata* Ach., in part, Lich. Univ. 550. 1810. *Cenomyce ecmocyna γ. C. macroceras* Ach., in part, Syn. Lich. 263. 1814. *Cladonia ecmocyna* f. *contorquescens* Nyl. in Norrlin, Notis. Sällsk. F. et Fl. Fennica Förhandl. **13:** 319. 1873. *C. gracilis* var. *ecmocyna* f. *rostrata* Zahlbr. Cat. Lich. Univ. **4:** 548. 1927.

Alaska: Etchepuk River, *Palmer,* 1923, No. 506, listed by Merrill (Bryologist **32:** 47. 1929), as *C. gracilis elongata.* **Quebec:** Frazier Island, Hudson Bay, *Gardner,* 1939, Nos. 93, 102, 103, and 105, listed by Gardner (Mém. Soc. Bot. France 1949: 93. 1950), as *C. gracilis* var. *elongata;* island at mouth of Kikkerteluk River, *Taylor,* 1944, No. 323; Mont Blanc, Matane Co., *Lepage,* 1942, No. 3510, listed by Lepage (Natur. Canadien **75:** 183. 1949); ten miles northeast of Cape Jones, *Lepage and Dutilly,* 1944, No. 6768. **Ontario:** twenty miles north of Lake River, James Bay, *Smith,* 1944, No. 67. **Manitoba:** Fort Churchill, *Gilett,* 1948, No. 1615. **Northwest Territories:** Leonard Island, Hobewan Sound, *Taylor,* 1944, Nos. 123, 317a, and 320. **Alberta:** Sulphur Mountain, near Banff, *Lamb,* 1951, No. 6195; Johnson Canyon, near Banff, *Lamb,* 1951, Nos. 6200 and 6206; Corral Creek, north of Lake Louise, *Lamb,* 1951, No. 6311; Redoubt Mountain, near Lake Louise, *Lamb,* 1951, No. 6314; Egypt Lake, *Lamb,* 1951, No. 6502. These stations are all in the Banff National Park. **British Columbia:** Yoho National Park, *Lamb,* 1951, No. 6373. **Maine:** summit of Mt. Katahdin, *Allard,* 1938, Nos. 5202 and 5204. **Colorado:** north slope of Twin Sisters Mountain, *Kiener,* 1930, Nos. 606, 607, and 619; vicinity of the University of Colorado camp, near Nederland, Boulder Co., *Miss Fulford,* 1936, No. 1024; near the Rocky Mountain Biological Station, Gothic, *Miss Fulford,* 1936, No. 1048; near Lake City, Hinsdale Co., *Darrow,* 1937, No. 1352; Long Lake, South St. Vrain, *Kiener,* 1937, No. 5241; Sandbeach Lake, Boulder Co., *Kiener,* 1937, Nos. 5603 and 9602; west slope, Trail Ridge, *Kiener,* 1938, No. 7153; Longs Peak, Larimer Co., *Kiener,* 1939, Nos. 8143, 8173, 9130, and 9237; Glacier Gorge, Larimer Co., *Kiener,* 1939, Nos. 9266, 9269, 9270, 9271, and 9273; Willow Creek Road, north of Granby, Grand Co., *Darrow,* 1947, Nos. 4106 and 4118. Most, if not all, of these stations are at high altitudes, 9,000–11,800 ft. **Wyoming:** Yellowstone National Park, *Blake,* 1927, five specimens without numbers, listed by Robbins (RHODORA **33:** 137. 1931), as *C. elongata* f. *laontera;* Medicine Bow, Carbon Co., *Manning,* 1935, No. 106; Yellowstone National Park, *Kiener,* 1936, Nos. 5943 and 5944. **Oregon:** near Clear Lake, Willamette Forest, *Sipe,* 1938 and 1939, Nos. 1037, 1045, and 1047; near Fish Lake, *Sipe,* 1939, No. 1028.

The specimens assigned to var. *macroceras* exhibit a considerable range of variability. In some cases the podetia, which are cupless or with narrow cups, are free from squamules or nearly so and agree in their morphological features with esquamulose specimens of *C. gracilis* var. *elongata,* such as those figured by Anders (1928, pl. 14, f. 1–3) under the name *C. elongata* var. *esquamosa.* In other cases the podetia are more or less squamulose, and this condition is found in much of the material from the

Rocky Mountains. Podetia of this type bear a striking resemblance to the podetia of *C. gracilis* var. *elongata* f. *laontera* (Del.) Arn., figured by Anders (1928, pl. 14, f. 5) under the name *C. elongata* var. *squamosa* f. *laontera.* In the more robust specimens of var. *macroceras* from North America the podetia are 2–3 mm. in diameter and attain a height of 6–8 cm.

CLADONIA ECMOCYNA var. **nigripes** (Nyl.) comb. nov. *C. ecmocyna* f. *nigripes* Nyl. in Norrlin, Notis. Sällsk. F. et Fl. Fennica Förhandl. **13:** 319. 1873. *C. ecmocyna* f. *gracilescens* Nyl. in Norrlin, Medd. Soc. F. et Fl. Fennica **1:** 13. 1876. *C. gracilis* var. *ecmocyna* f. *nigripes* ("*nigriceps*") Zahlb. Cat. Lich. Univ. **4:** 548. 1927.

Alaska: Etchepuk River, *Palmer*, 1923, No. 494, listed by Merrill (Bryologist **32:** 47. 1929), as *C. gracilis chordalis;* Peace River, *Palmer*, 1923, No. 623, listed by Merrill (l. c.), as *C. gracilis chordalis;* upper Buckland River, *Palmer*, 1924, No. 933; First Chance Creek, *Palmer*, 1924, No. 941; Cantwell, *Palmer*, 1926, No. 1454; between Palmer and Willow, *Dutilly, Lepage and O'Neill*, 1947, No. 22,181; Umiat, *Scholander*, 1948, no number; same locality, *Llano*, 1949, No. 534b; Kodiak Island, *Llano*, 1949, No. 1801b; Kenai Mountains, *Lutz*, 1949, No. 421. Most of the specimens of *C. ecmocyna* from Alaska are duplicates of specimens in the U. S. National Herbarium. **Quebec:** ten miles northeast of Cape Jones, *Lepage and Dutilly*, 1944, No. 6507; Manik Lake, Rogan River, Ungava, *Lepage*, 1950, No. 13,152. **Northwest Territories:** Christopher (Shell) Island, *Polunin*, 1946, No. 18,750. **Alberta:** Twin Cairns Mountain, Banff National Park, *Lamb*, 1951, No. 6500; "Lake Nipigon and Rocky Mountains," *Macoun*, 1885, distributed in Macoun's Canadian Lichens, No. 95, as *C. gracilis* var. *elongata* f. *chordalis*, station doubtful but perhaps in Alberta. **British Columbia:** Parson's Mountain, Vancouver Island, *Macoun*, 1893, distributed in Macoun's Canadian Lichens, No. 161, as *C. gracilis* var. *elongata* f. *macroceras.* **Colorado:** Willow Creek Pass, north of Granby, Grand Co., *Darrow*, 1947, No. 4117. **Wyoming:** Canyon Junction, Yellowstone National Park, *Blake*, 1927, no number, listed by Robbins (RHODORA **33:** 137. 1931), as *C. elongata* f. *ecmocyna* .**Washington:** Yakima Park, Mt. Rainier, *Miss Howard*, 1931, No. 600, listed by the collector (Bryologist **40:** 100. 1937), as *C. amaurocraea.* **Oregon:** Hardesty Mountain trail, Willamette Forest, *Sipe*, 1933, No. 809.

The specimens of var. *nigripes* show less variability than those of var. *macroceras,* and the podetia in the North American material are either entirely free from squamules or very sparingly squamulose toward the base. Most of the podetia are cupless and taper to sharp points, but occasional examples form narrow cups, which may give off marginal proliferations. The podetia rarely exceed 1 mm. in diameter or 5 cm. in height and are therefore more slender and usually shorter than those of var. *macroceras*. Typical specimens are more or less pigmented with brown and agree, in their morphological features, with *C. gracilis* var. *chordalis* f. *amaura* Floerke, as illustrated by Anders (1928, pl. 13, f. 12).

CLADONIA ECMOCYNA var. **intermedia** (Robbins) comb. nov. *C. elongata* f. *intermedia* Robbins, RHODORA **33:** 137. 1931.

Manitoba: Fort Churchill, *Thomson*, 1950, No. 3418; Farnsworth Lake, Churchill, *Edmund*, 1950, No. 25,214. **Alberta:** Lake Agnes, near Lake Louise, Banff National Park, *Lamb*, 1951, No. 6277. **British Columbia:** Yoho National Park, *Lamb*, 1951, No. 6363. **Wyoming:** Canyon Junction, Yellowstone National Park, *Blake*, 1927, no number (type of *C. elongata* f. *intermedia*); Yellowstone National Park, *Blake*, 1927, no number, listed by Robbins (RHODORA **33:** 137. 1931), as *C. elongata* f. *ecmocyna*.

The robust podetia of var. *intermedia* broaden out gradually and form broad and shallow cups, which are mostly 5–8 mm. in width. Some are sterile but many bear brown apothecia, either sessile or shortly and irregularly stipitate. In rare instances one or two marginal proliferations are present. Aside from the cups the podetia are much like those of var. *macroceras* and may be more or less squamulose or free from squamules. The type-specimen of *C. elongata* f. *intermedia*, as illustrated by Robbins (1931, pl. 209, f. 1), is both squamulose and fertile. The figure of *C. ecmocyna* published by Anders (1928, pl. 14, f. 8) shows broad cups with marginal proliferations. In all probability the specimens figured represent var. *intermedia*, although not wholly in agreement with the North American specimens.

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PERLUSTRATIONES PLANTARUM ARCTICARUM IV:

'Parry Plants' Added to the University Herbaria, Oxford

Nicholas Polunin

That the various Herbaria belonging to Oxford University, rich as they were in ancient collections and type specimens, lacked special 'sets' of plants from Sir W. E. Parry's arctic expeditions, had long been a source of regret—especially in view of the number and excellence of such sets that were known to be deposited in other institutions in Europe and North America—for the botanical collections made during Parry's expeditions were practically the first of real scientific value to be brought back from the American Arctic. To be sure, the Fielding Herbarium (Oxford's main, general herbarium) contained a useful total of specimens from Parry's first two expeditions, apparently collected in a very few instances by the great man himself, and more often by his surgeons John Edwards and Alexander Fisher, or by his lieutenants Beechey, Hoppner, or J. C. Ross (all of whom, and also

Dr. Walker of M'Clintock's notable voyage in search of Sir John Franklin, and Captain Sabine and E. P. Philpots, though represented by specimens in the Fielding Herbarium, are missing from Vines and Druce's 'Account . . . Part II'[1]). But still of Parry plants there were only scattered specimens, often of a very scrappy nature, and, most unfortunately, more frequently than not, entirely unlocalized. In other respects, too, the labelling seemed deficient—as in the frequent mention of a "Cap. Cheyne" of "Cap. Parry's 1st or 2nd voyage," though no such gentleman appears to be mentioned in Parry's official account of either of these expeditions.[2] Proper sets were lacking, and to me this seemed a particularly sad 'gap.'

Accordingly, on being appointed in 1939 to succeed the late Dr. G. Claridge Druce, as Fielding Curator and at the same time Keeper of the University Herbaria, by then multiplied and further extended, I resolved to try to remedy the deficiency. Attempts were so successful (or good fortune such) that the Herbaria now possess three special sets of 'Parry plants'—one large and important, another large but less significant, and the third very small but fortunately containing notes by Parry himself. I myself have been given two further sets which can be considered as added to the others, although for the time being I am retaining them, as they were given to me personally for purposes of comparison and reference.

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[1] 'An account of the Herbarium of the University of Oxford, Part II,' by S. H. Vines and G. Claridge Druce, *Oxford:* Clarendon Press, pp. 21–55, 1919. This account has long been out of print and is now hopelessly out of date, so it is hoped that the complete revision, commenced during the present writer's period in charge, will soon be available.

[2] There is, however, mention on pp. 66 *et seq.* of Parry's account of his 'second' voyage (*see* footnote 6, below) of a 'Point Cheyne' lying in about 66° 09′ N. lat., and 84° 30′ W. long., on the south coast of Melville Peninsula, bordering on Hurd Channel. Point Cheyne was so named by Parry's second in command on this 'second' voyage, Captain G. F. Lyon, "after my old friend and messmate Captain Cheyne," as Lyon himself informs us in his 'Private Journal of Captain G. F. Lyon, of H. M. S. Hecla, during the recent voyage of discovery under Captain Parry'—*London:* pp. xii + 468, map and plates, 1824. Cheyne was evidently not with Lyon on the latter's voyage to these regions in 1824 (*see* G. F. Lyon 'A brief Narrative of an unsucessful attempt to reach Repulse Bay . . . '—*London:* pp. xvi + 199, map and plates, 1825), when some plants were "gathered upon a few low islands which were met with in, or near, the position assigned to Southampton Island"; indeed Cheyne does not appear ever to have visited the Arctic, unless it was as a very young man before his promotion to the rank of lieutenant in 1813, according to the Acting Librarian to the British Admiralty (*in litt.*). The labels are evidently misleading—perhaps referring to the mere passing on or 'communicating' of the specimens by Cheyne who had been given them by the collector or some other person.

Oxford has thus acquired or will possess five sets in all, coming from different sources, and the object of the present contribution is to relate them as far as possible to other known sets, and, where necessary, describe them and note such "new records" as they may afford. This is rendered the more necessary in view of the hasty treatment that has in the past greeted the discovery of other sets—as, for example, the Bristol Naturalists' Society's set described in Perl. I,* and now given to Oxford. Indeed two of the five sets with which we are here concerned were described in Perl. I, which leaves only three to be treated in detail.

One of the sets given directly to the University will be described first as 'A' (below). It was sent to me at Oxford by Professor W. Rae Sherriffs, of the then University College, Southampton, as a gift to the Department of Botany—as already recorded in the North Western Naturalist[3] and in the Department's annual report for the year ending 31 July 1942 (*Oxford University Gazette*, LXXIII, p. 320, 1943). One of the sets given to me privately will be described in detail as 'B' (below); the other is the 'University of Durham set' described in Perl. I, for which I am very deeply indebted to Professor J. W. Heslop Harrison, to whom it had actually belonged. The third, small set belonging to the University Herbaria was transferred thereto by Mr. R. C. Spiller, University Reader in Mineralogy, Oxford, who found it among the effects left by his predecessor, the late Professor H. L. Bowman; it will be described under 'C' (below).

The order and nomenclature followed in the plant lists given below are in general those of my 'Botany of the Canadian Eastern Arctic,' Parts I[4] and II,[5] to which reference may be made for details of distribution, etc., though subsequent information and nomenclatural and other changes should be, and where possible here already are, taken into consideration. Where the name used for a plant is different from that employed for it in those works, sufficient synonymy is given for direct reference thereto.

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* References of this type are to previous installments in the present series.

[3] Polunin, Nicholas. 'On some early collections of arctic plants.' *North Western Naturalist*, XVII, pp. 168–173, 1942.

[4] Polunin, Nicholas. 'Botany of the Canadian Eastern Arctic, Part I: Pteridophyta and Spermatophyta.' *Canada:* National Museum Bulletin No. 92, pp. vi + 408, maps and plates, 1940.

[5] 'Botany of the Canadian Eastern Arctic, Part II: Thallophyta and Bryophyta,' including contributions by R. M. Whelden, G. Seidenfaden, R. Ross, D. H. Linder, B. Lynge, and W. C. Steere, compiled and edited by Nicholas Polunin. *Canada:* National Museum Bulletin No. 97, pp. v + 573, maps, etc., and plates, 1947.

A

Professor Sherriffs's donation of 'Parry plants' was followed by a box of rocks and minerals which had been collected on the same expedition. These non-botanical specimens, with his permission, I passed on to the Department of Geology, on whose behalf they were accepted by Professor J. A. Douglas (*Oxford University Gazette*, LXXIII, p. 314, 1943). A note written in Parry's hand, evidently referring to both plants and hardware, but which I took the liberty of retaining with the former, reads as follows: "Captain Parry presents his compliments to Mrs. Sturges Bourne, and requests her acceptance of the accompanying very rough box of trifles from the Arctic Seas. London Novr. 26th. 1823." This note is addressed on the back simply "Mrs. Sturges Bourne." Writing from Southampton, England, Professor Sherriffs suggests that this was "probably a local lady," and, concerning the entire material, that she "presented it to the long-defunct Hartley Institution in this town."

Parry himself mentions on page 75 of the account[6] of his 'second' voyage, during which the present collection was evidently made (*see* below), "The Right Honourable William Sturges Bourne," after whom he named the group of islands lying around lat. 66° N. and long. 83° 45′ W., to the east of the larger Vansittart Island. Sturges Bourne was a man of note. After a long and distinguished political career, during which he appears to have refused high office over and over again, he retired from Parliament in 1831 and at the same time from all public offices except that of Lord Warden of the New Forest. He was M. P. for Christchurch during two long periods and died at Testwood House, near Southampton, in 1845; thus his wife was indeed a 'local lady' to a considerable extent, though originally a native of Oxford, to which it is accordingly all the more appropriate these specimens should come.

This plant collection consists of 35 specimens mounted on separate sheetlets of medium-weight paper (rather heavier than that of the differently watermarked first set described in Perl. I), each measuring 10.8 by 17.7 cm. The sheetlets are apparently all of similar origin, being of closely comparable (though no longer always identical) color and texture, and in many instances watermarked with parts of the text "R. Barnard 1822" in large (15 mm.) and small (12 mm.) capital letters. A 36th sheetlet without any specimen also conforms to this type; but the paper on which Parry's note of presentation is written had clearly some other origin. The collection is enclosed in two paper-covered metal sheets of similar size, on the outside of one of which is stuck a tiny label bearing the single word "Plants," apparently in Parry's hand.

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[6] Parry, W. E. 'Journal of a second voyage for the discovery of a North-West Passage from the Atlantic to the Pacific; performed in the years 1821–22–23, in His Majesty's Ships Fury and Hecla.' *London:* pp. xxxi + 571, maps and plates, 1824.

The sheetlets bearing specimens are all uncommonly well labelled with both the locality and date of collection of each individual specimen. These labels, though in a hand somewhat resembling Parry's, were clearly written by somebody else—quite likely by the collector, though unfortunately there is no note as to who he was; nor was I able to determine this in the circumstances of segregation of many Admiralty and other records. The places named on the labels are all familiar localities visited during Parry's 'second' voyage, and the dates all tally with the narrative of this[6] (with the possible exception of one or two having a suggested discrepancy of at most three days). The localities are on, or on islands near, Melville Peninsula—with the exception of Duke of York's (York) Bay, which is nearby in Southampton Island, and the Upper Savage Island, which is in Hudson Strait, off the southern coast of Baffin Island.

All of the plant species represented in the present collection appear to be mentioned or otherwise 'covered' in Sir William Hooker's 'Botanical appendix'[7] to Parry's account of the voyage, though by no means all of the individual records afforded by the present set are given in Hooker's appendix, which once again (cf. Perl. I, II, and III) appears to have been written without the author consulting by any means all of the sets of plants brought back by the expedition.* Thus there can be practically no doubt that he did not see the present one except possibly after drafting his 'Botanical appendix.' This and other points of interest should be clear from the following list of plants comprising the set, which in view of its size and unusually detailed

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[7] Hooker, W. J. 'Botanical appendix': pp. 381–430 of the 'Appendix to Captain Parry's journal of a second voyage . . .' *London:* pp. 432 and plates, 1825.

* Note also in this connection Hooker's remark on p. 426 of his 'Botanical appendix' concerning a specimen "Received by Mr. Greville from some gentleman of the Expedition."

'individual' labels, as well as the general (but not universal) excellence of the specimens, is a particularly valuable one. My thanks are due to the following for expert help with identifications: Drs. E. M. Delf and R. M. Whelden (Algae), Dr. W. Watson and Mr. Eilif Dahl (Lichenes), Dr. A. R. Clapham and Mr. James Kucyniak (Musci).

AGARUM CRIBOSUM (Mertens) Bory (*A. turneri* Post. & Rupr.). "Found on the surface of the sea about the middle of Hudson's Strait, 29th July 1821"—cf. Hooker (*l. c.* pp. 426–7 sub nom. '*Laminaria Agarum*'). Dr. E. M. Delf, to whom this and the next specimen were submitted, pronounced the material insufficient for certain determination except by "someone very familiar with the structure of thalloid Algae of all sorts," but this need was subsequently filled by Dr. R. M. Whelden with the above results. I have myself found this remarkable Alga not far to the southeast of the 'middle of' Hudson Strait, cast up in plenty on the shores of Akpatok Island,[8] and several times farther north in the Canadian Eastern Arctic, both at Dundas Harbour, Devon Island, and in Pond Inlet, Baffin Island.[5] There is an apparently duplicate specimen in the set recently transferred from the Scott Polar Research Institute to the University Herbarium, Cambridge, England.

PTILOTA PLUMOSA (L.) C. A. Agardh. "Found on the surface of the sea about the middle of Hudson's Strait, 29th July 1821"—cf. Hooker (*l. c.* pp. 427–8). The provisional determination was subsequently confirmed by Dr. R. M. Whelden.

CLADONIA ALPESTRIS (L.) Rabenh. "Upper Savage Island, Hudson's Strait, 24th July 1821." Hooker (*l. c.* pp. 424–5) already reports '*Cenomyce rangiferinus*,' which may quite likely refer to that allied species, from Upper Savage Island. This determination was kindly verified by Dr. W. Watson, who remarked (*in litt.*) that the specimen possessed "rather thicker branches than usual." The occurrence of *C. alpestris* on Upper Savage Island was already announced by Dr. I. M. Lamb, then of the British Museum, in a letter which he wrote to the late Professor Bernt Lynge (of Oslo) who, in his contribution on the lichens in Bot. Can. E. Arctic II,[5] confirms it as being plentiful in, particularly, the subarctic parts of eastern America. There is an apparently duplicate specimen in the set recently transferred from the Scott Polar Research Institute to the University Herbarium, Cambridge, England.

CETRARIA DELISEI (Bory) Th. Fr. "Repulse Bay, August 22nd 1821." *Det.* Eilif Dahl. Hooker (*l. c.* p. 423) does not mention any *Cetraria* from Repulse Bay, which suggests that he did not consult the present collection (*see* above). According to Lynge,[5] *C. delisei* is "common and widespread" in the Canadian Eastern Arctic—as I can myself confirm from numerous field observations made during several expeditions in the region. The species appears to be the "*C. islandica* . . . Var. Thallo opaco, ramulis numerosissimis" of Hooker (*l. c.* p. 423).

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[8] Polunin, Nicholas. 'The Flora of Akpatok Island, Hudson Strait.' *Journal of Botany*, 72, pp. 197–204, 1934.

Cetraria cucullata (Bell.) Ach. "The Island of Igloolik, July 1822"—cf. Hooker (*l. c.* p. 423). *Fide* Eilif Dahl. Dr. W. Watson remarks (*in litt.*) that "This specimen is not so pale as is usual," but such is also the case with most of the other century-and-more old specimens in the Fielding Herbarium and would accordingly appear to be an attribute of age. Lynge[5] dismisses the species as "very common . . . all over the [Canadian Eastern Arctic] region."

Alectoria ochroleuca (Ehrh.) Nyl. "Upper Savage Island, Hudson's Strait, 24th July 1821"—cf. Hooker (*l. c.* p. 426, sub. syn. *Cornicularia ochroleuca*). Lynge[5] remarked that "this species is plentiful all over the Canadian Eastern Arctic," and so I can confirm from my collections and ecological notes taken during 1931–4.

Caloplaca elegans (Link) Th. Fr. "Repulse Bay, August 22nd 1821." Hooker (*l. c.* p. 422, sub syn. *Lecanora elegans*) reports this plant from several of the localities visited on Parry's 'second' voyage but not from Repulse Bay, which suggests again that he did not see the present collection. The species is "a very common one, distributed all over the [Canadian Eastern Arctic] region" (according to Lynge[5]), and has already been recorded from several localities on or about Melville Peninsula, though Repulse Bay appears to be an addition to those hitherto known.

Tetraplodon mnioides, var. urceolatus (Brid.) Steere. "Repulse Bay, August 22nd 1821"—cf. Hooker (*l. c.* p. 419). In making this combination in his contribution to Bot. Can. E. Arctic II, Steere[5] remarks that this variety is "widespread in the Canadian Eastern Arctic, but apparently not common," commenting also that "It has been pointed out by many authors that this moss intergrades with *T. mnioides,* especially at the highest altitudes and latitudes. Indeed more than a century ago Hooker . . . said of *T. mnioides* from Arctic America 'The leaves are here more concave, than they are in my British and European specimens of this moss; and those of *S. urceolatum* are less so; thus, as it were, uniting the two species.' This same overlapping of the two forms has been noticed in the collections of Polunin and other recent explorers, and the conclusion has been reached that *T. urceolatus* is only a reduced form of *T. mnioides.*"

Haplodon wormskjoldii (Hornem.) R. Br. (*Splachnum wormskjoldii* Hornem.). "Island of Igloolik, July 18th 1822"—cf. Hooker (*l. c.* p. 418, sub syn. "*Aplodon Wormskioldii*"). Steere[5] writes of this moss "Plentiful in the Far North and widespread through the rest of the Canadian Eastern Arctic. Grows chiefly on decaying animals and dung." There is an apparently duplicate specimen in the set recently transferred from the Scott Polar Research Institute to the University Herbarium, Cambridge, England.

Hierochloe alpina (Sw.) Roem. & Schult. "South shore of the Strait of the Fury and Hecla, August 27th 1822"—cf. Hooker (*l. c.* p. 410).

Trisetum spicatum (L.) Richt., var. maidenii (Gandoger) Fernald. "Duckett Cove, August 28th 1821"—cf. Hooker (*l. c.* p. 409, sub syn. *T. subspicatum*).

Pleuropogon sabinii R. Br. "Duke of York* Bay, Southampton Island, August 18th 1821"—cf. Hooker (*l. c.* p. 409). Concerning the rendering 'sabinii,' *see* Bull. Torrey Bot. Club, **71,** p. 248, 1944, and **77,** p. 220, 1950, the latter proposal being adopted at the Stockholm Congress.

Poa arctica R. Br. "Duke of York* Bay, Southampton Island, August 18th 1821"—cf. Hooker (*l. c.* p. 408).

Puccinellia angustata (R. Br.) Rand & Redfield, *s. l.* "The Island of Igloolik, July 1822"—cf. Hooker (*l. c.* p. 408, sub syn. *Poa angustata*).

Carex misandra R. Br. "Five Hawser Bay, Lyon Inlet, 9th Sept. 1821"—cf. Hooker (*l. c.* p. 406, sub nom. *C. fuliginosa β squamis*), whose "*β squamis* Capsulisque pallide fuscis" appears to be a purely minor variant (even though the relatively light color of the present inflorescence, which had been gathered as late as 9 September, is more often seen only in much 'younger' specimens) whose extreme is expressed in f. *flavida* Fernald (of Bot. Can. E. Arctic I, though this ought to be styled f. *ochrolochin* Ostenfeld ex Ostenfeld & Lundager). This is the only specimen I know which confirms Hooker's report (*l. c.*) of this species from Five Hawser Bay; but it still does not necessarily indicate that he saw the present collection, as indeed he almost certainly did not (*see* above).

? Salix arctica Pall., *s. l.* "The Island of Igloolik, July 1822"—cf. Hooker (*l. c.* p. 404). An indeterminable scrap labelled "Salix Arctica" and probably belonging to this very common and variable species. All labels on the sheetlets appear to be in the same hand. Where specific identifications are attempted I have noted the fact in this paper; but where generic names alone have been suggested, as is frequently done near the bottom of the sheet, I have not considered this worthy of remark.

Oxyria digyna (L.) Hill. "South shore of the Strait of the Fury and Hecla, August 27th 1822"—cf. Hooker (*l. c.* p. 403, sub syn. *Oxyria reniformis*).

Polygonum viviparum L. "Duckett Cove, August 28th 1821"—cf. Hooker (*l. c.* p. 403).

Lychnis apetala L. "Duke of York's Bay, Southampton Island, August 18th 1821"—cf. Hooker (*l. c.* p. 389). Correctly named on the sheetlet, in the usual hand of all the other labels written on the sheetlets (as opposed to the accompanying note and single word written, apparently, by Parry—*see* above).

Cerastium alpinum L., *s. l.* "The Island of Igloolik, July 1822"—cf. Hooker (*l. c.* p. 390). Correctly named on sheetlet. There is an apparently duplicate specimen in the set recently transferred from the Scott Polar Research Institute to the University Herbarium, Cambridge, England.

Arenaria rubella (Wahlenb.) Sm. "Island of Neerlo-nakto, August 15th 1822"—cf. Hooker (*l. c.* p. 391). Correctly named on sheetlet.

Papaver radicatum Rottb. "Island of Neerlo-nakto, August 15th 1822." Hooker (*l. c.* pp. 384–5) records this plant (sub nom. *P. nudicaule*, which the present sheet is labelled) from "Igloolik. 1822 and 1823. Duckett Cove. Repulse Bay" but not from Neerlo Nakto (as it is now written on Canadian Government maps). The fact that Hooker expressly says: "The specimens of this plant are from seven to eight inches high, with their corolla, when fully expanded, nearly two inches in diameter," excludes the present specimen (which is barely four inches high, with the corolla, although expanded, less than one inch in diameter), and further indicates that Hooker did not consider the present collection when writing his 'Botanical appendix.'[7] Dr. A. C. Fabergé has published (in *Journ. Genetics*, **46**, p. 140, 1944) his figures of the chromosome number of plants grown from seed which I collected for him in 1936 in the Canadian Eastern Arctic: that from Pond Inlet in north-eastern Baffin Island, and from Chesterfield on the west coast of Hudson Bay, was all n = 28; that from Clyde on the east coast of Baffin Island was n = ±28. On the other hand, material from Reykjavik, Iceland, gave n = 35 (Fabergé *l. c.*). The seeds which I sent Dr. Fabergé from south-western Greenland in 1937 failed to germinate,[9] but others of *P. radicatum* and *P. macounii* which I sent more recently from the north coast of Alaska to Copenhagen proved viable and gave 2n = 42 (C. A. Jørgensen *in litt.*). It is now being determined which, if not both, of these species is involved.

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* Apart from superfluous commas, etc., the labels are copied exactly, although slight variations in their orthography (e. g. 'York's' for 'York') appear to be without significance.

DRABA FLADNIZENSIS Wulfen, *s. l.* "Five Hawser Bay, Lyon Inlet, 9th Sept. 1821"; also labelled "Draba Androsarea" (*sic*) in the usual, apparently contemporary, hand. Hooker (*l. c.* pp. 386–7) includes this and some other species as varieties of *D. hirta*, but does not record any of these varieties, or indeed any *Draba* at all, from Five Hawser Bay. The present collection contains another, flowering specimen which I take to belong also to the *D. fladnizensis* complex—this time from "Duckett Cove, August 28th 1821", whence Hooker (*l. c.* p. 386) recorded his "D. hirta . . . Var. 4. 1–3-pollicaris, foliis integerrimis scapo gracili aphyllo," to which this specimen indeed conforms.

DRABA CINEREA Adams. "The Island of Igloolik, July 1822"—cf. Hooker, who reports (*l. c.* pp. 385–7) all five of his 'varieties' of *D. hirta* from this place. The present specimen is scarcely determinable, having lost all reproductive structures; in spite of some unusually long and straight hairs it comes nearest to my conception of *D. cinerea.*

SAXIFRAGA CAESPITOSA, subsp. EUCAESPITOSA f. UNIFLORA (R. Br.) Engler & Irmscher. "The Island of Igloolik, July 1822"—cf. Hooker (*l. c.* p. 393).

SAXIFRAGA AIZOIDES L. "Duke of York's Bay, Southampton Island, August 18th 1821." Hooker (*l. c.* p. 393) records this species only from Igloolik; but quite apart from the present specimen, I have seen, in the British Museum and Copenhagen herbaria, others gathered by members of the same expedition at what is now called 'York Bay' on Canadian Government maps—which suggests once again that Hooker did not cover by any means all of the pertinent material when writing his 'Botanical appendix.'

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[9] Polunin, Nicholas. 'Contributions to the flora and phytogeography of south-western Greenland: an enumeration of the vascular plants, with critical notes.' *Journal of the Linnean Society, Botany*, LII, pp. 349–406, 1943.

SAXIFRAGA TRICUSPIDATA Rottb. "Duke of York's Bay, Southampton Island, August 18th 1821"—cf. Hooker (*l. c.* p. 393). Labelled "Saxifraga Triuspictata" (*sic*).

SAXIFRAGA HIRCULUS L. "Duke of York's Bay, Southampton Island, August 18th 1821." Hooker (*l. c.* p. 392) reports only the northern extreme phase which we now call var. *propinqua* (R. Br.) Simmons, and which is represented in the present collection by a separate specimen, labelled "Island of Neerlo-nakto, August 15th 1822. Saxifraga Propinqua." The strikingly different typical form occurs plentifully farther south in Southampton Island, as I have myself seen during several visits there, but does not appear to have been previously detected from York Bay, though well exemplified by the narrow leaves and long petals of the present specimen.

SAXIFRAGA OPPOSITIFOLIA L. "Island of Neerlo-nakto, August 15th 1822." Hooker (*l. c.* p. 392) faithfully records this almost universally (in the Arctic) common species from several other places visited on the voyage but not from Neerlo Nakto, which again suggests that he did not see the present specimen which is labelled "Saxifraga Oppositafolia" (*sic*).

POTENTILLA VAHLIANA Lehm. "South shore of the Strait of the Fury and Hecla, August 27th 1822"—cf. Hooker (*l. c.* p. 395, sub nom. *P. nivea*). The present specimen is labelled, in the usual hand, "Potentilla Nivei" (*sic*). There is an apparently duplicate specimen in the set recently transferred from the Scott Polar Research Institute to the University Herbarium, Cambridge, England.

OXYTROPIS MAYDELLIANA Trautv. "Five Hawser Bay, Lyon Inlet, 9th Sept. 1821." This appears to be a new locality for the present, perfectly distinct and relatively widespread species, which, however, was already known to be common on and about Melville Peninsula—*see* Bot. Can. E. Arctic I, p. 292. It is noteworthy that, whatever may have been the state of confusion in this genus at the time, Hooker (*l. c.* p. 396) fails to report any *Oxytropis* from Five Hawser Bay or anywhere else in Lyon Inlet.

PEDICULARIS HIRSUTA L. "The Island of Igloolik, July 1822"—cf. Hooker (*l. c.* p. 402). Labelled "Pedicularis Arctica"—of which, however, I have not seen typical specimens (or, I now think, even doubtful ones) from Melville Peninsula or its accompanying islands. There is an apparently duplicate specimen in the set recently transferred from the Scott Polar Research Institute to the University Herbarium, Cambridge, England—*see* Perl VII. (in prep.)

ERIGERON HUMILIS Graham (*E. unalaschkensis* (DC.) Vierh.), approaching *E. eriocephalus* J. Vahl. "Five Hawser Bay, Lyon Inlet, 9th Sept. 1821"—cf. Hooker (*l. c.* p. 398, sub nom. *E. uniflorum*). The specimen is labelled "Erigeron uniflorum" (*sic*).

B

The second set to be described in the present contribution was given to me by the present Admiral Sir W. E. Parry and his mother, Lady (Anna) Parry, whose letter (dated 10 August 1942) announced that her son had found the set during a brief period of leave among the papers of his father, the late Sir Sydney Parry (*see* Perl. II), grandson of the navigator. The set consists of 17 specimens mounted on sheetlets that had been cut, not always regularly, by some sharp instrument. The paper is thick and had evidently been made in rather large sheets, being all of the same weight, texture, and color, and showing no watermarking except in two instances which have sufficient lettering to indicate that the source is the same as that of the sheetlets of set 'C' of the Manchester Herbarium possessions described in Perl. II, one of which is watermarked "1826." In both these sets the sheetlets are 15–16 cm. long by 9–10 cm. wide; presumably they were once all together, quite likely remaining so for some time after the specimens were mounted and possibly even until relatively recently.

The set now being considered is enclosed in a home-made folder of slightly thicker and smoother paper with a 'fancy' gilded margin. It bears on the outside the following caption, in what appears to be a child's hand: "Specimens of Arctic Plants Collected by W. E. Parry R.N. A.D. 1819–20–21." Inside is a sheetlet of still thicker paper or really card bearing the following label in Parry's hand, ending with his formal signature: "Specimens of Plants Collected in the Polar Regions by W. Parry." The only other sheetlet (apart from the 17 bearing specimens) is of rather thin paper of entirely different color and watermarking, used evidently to enclose the set as, like the card bearing Parry's label, it is slit by two parallel cuts (apparently to hold a ribbon, though none was present when the set reached me).

The individual sheetlets bearing specimens were unmarked on their faces except in one case (*see* below) which bears a label indicating that the specimen had come from Melville Island, where it must have been collected during Parry's 'first' voyage.[10]

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[10] Parry, W. E. 'Journal of a voyage for the discovery of a North-West Passage from the Atlantic to the Pacific; performed in the years 1819–20, in His Majesty's Ships Hecla and Griper.' *London:* pp. xxix + 310, and appendix, 1821.

Thus of the total of three detailed labels accompanying the set, the two quoted in the last paragraph are 'general' and not to be relied upon as necessarily covering all of the enclosed specimens (cf. Perl. I, II, and III). Nor is either of these very helpful, although both may well be accurate as far as they go. That written by Parry could scarcely be otherwise, from its own nature as well as what we know of the man; that on the outside cover may perhaps indicate rightly that the specimens emanated from both Parry's 'first' and 'second' voyages, as the years mentioned suggest. However this may be, there can scarcely be any possible chance of settling the outstanding questions of dates or localities, though it may be noted that, of the 17 different plants represented, no less than 14 are mentioned in Robert Brown's 'Chloris Melvilliana.'[11] A fifteenth appears to involve hybridization of a species long known to be plentiful on Melville Island with another (*Saxifraga hieracifolia*) which has not been recorded therefrom, though very likely to occur there, while the sixteenth, apparently not recognized by Brown but merged in his "Polymorpha species" *Potentilla nivea*, was collected on the same expedition and is now well known to occur on Melville Island (*see* Simmons, p. 108,[12] and cf. Perl. II), where the seventeenth has been discovered since. Thus there is to my mind no ground for serious argument against the specimens composing this set having all come from Melville Island, but on the other hand no adequate indication (with one exception) that they did; so accordingly, once again, no new records can safely be founded on this set.

A description of this little collection follows: instead of referring each item to the appropriate place in Robert Brown's account[11] it will be sufficient to give synonyms where different names are employed in that work—except in the instances of the three plants which are not there mentioned, of which more detailed accounts will be necessary.

POA ABBREVIATA R. Br.

POA ARCTICA R. Br.

OXYRIA DIGYNA (L.) Hill. *See* Brown (*l. c.* p. cclxxxii, sub syn. *Oxyria reniformis*).

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[11] Brown, R. 'A list of plants, collected in Melville Island, by the officers of the Expedition; with characters and descriptions of the new species': pp. cclxi–cccx in 'A supplement to the appendix of Captain Parry's voyage . . .' *London:* pp. clxxx–cccx and plates, 1824.

[12] Simmons, H. G. 'A survey of the phytogeography of the Arctic American Archipelago.' *Lunds Universitets Årsskrift*, N. F. Afd. 2, ix, Nr. 19, pp. 1–183 and maps, 1913.

Polygonum viviparum L. Correctly named on back of sheetlet in pencil, in a hand which may possibly be Parry's.

Cerastium alpinum L., *s. l.*

Papaver radicatum Rottb. *See* Brown (*l. c.* p. cclxv, sub nom. *Papaver nudicaule*). Labelled "Papaver Nudicaule Melville Island North Georgia" in the same hand as the specimen so labelled in the Manchester Herbarium (*see* Perl. II), which is also of very similar appearance and flowering state. The writing is in pencil in both cases, and may possibly be Parry's.

Braya purpurascens, var. dubia (R. Br.) O. E. Schulz. *See* Brown (*l. c.* p. cclxvii, sub syn. *Platypetalum dubium*).

Saxifraga caespitosa, subsp. eucaespitosa, f. uniflora (R. Br.) Engler & Irmscher. *See* Brown (*l. c.* p. cclxxiv, sub syn. *Saxifraga uniflora*).

Saxifraga cernua L.

Saxifraga foliolosa R. Br. (*S. stellaris* var. *comosa* Retz.).

Saxifraga nivalis L.

Saxifraga cf. hieracifolia × nivalis. *Saxifraga hieracifolia* Waldst. & Kit. is not known to occur on Melville Island, though its range and requirements suggest that it most probably grows there. The present specimen is more reminiscent of it than is the somewhat similar one in the Manchester Herbarium's set 'C' (*see* Perl. II), but still retains some of the characters of *S. nivalis*. The two species appear to hybridize rather freely in the Canadian Far North, if one may judge by the intermediate forms that are to be found.

Saxifraga flagellaris Willd. ex Sternb.

Potentilla hyparctica Malte (*P. emarginata* var. *typica* Abrom. of Bot. Can. E. Arctic I[4], but the specific epithet is invalidated by an earlier homonym—*see* Fernald in *Rhodora* XLV, pp. 111–2, 1943). Apparently not distinguished by Brown (*l. c.* p. cclxxvii) from the polymorphic *P. nivea*, but collected on Melville Island by several expeditions (including Parry's of 1819–20 according to Simmons, p. 108[12]).

Cassiope tetragona (L.) D. Don. *See* Brown (*l. c.* p. cclxxx, sub syn. *Andromeda tetragona*).

Pedicularis hirsuta L. This is the 'seventeenth' plant, which, though not recorded by Brown (*l. c.*), has since been reported from Melville Island by Simmons (*l. c.* p. 124), the basis of whose testimony there seems no reason to doubt in spite of the slight scepticism he himself expressed.

Taraxacum phymatocarpum J. Vahl in Hornem., *s. l.* *See* Brown (*l. c.* p. cclxxviii, sub nom. *Leontodon palustre*).

C

This smallest set of 'Parry plants' recently added to the Oxford University Herbaria is the last which need be described here. It had been presented to the Department of Mineralogy, University Museum, Oxford, by the late Mr. H. G. Madan—probably in 1901 with the "large collection of apparatus . . . presented towards the close of the year and shortly before his death" (*Oxford University Gazette*, XXXII, p. 650, 1902), but was lately transferred to the Herbaria of the University Department of Botany by Mr. R. C. Spiller (*see* above).

The set is accompanied by a caption on a separate slip of paper written by Mr. Madan as follows: "Arctic Plants collected by Capt. Sir W. E. Parry. R.N. 1819-21." This caption appears to be a mere contraction of an earlier one saying "Specimens of Arctic Plants collected by Captn. Sir W. E. Parry. RN. AD. 1819.20.21", on a small label stuck on a carefully fashioned board of exotic wood which is very reminiscent of, and indeed closely comparable with, that accompanying the Manchester set 'C' described in Perl. II. However, it bears no signature and may have been written considerably later (Parry was not knighted until 1829), though again I think the writing is probably Parry's. Inside, on a separate sheetlet of thin paper, comes a caption written in a hand quite typical of Parry's when a youngish man, and containing his formal signature of those times: "Arctic Plants Collected by W. Parry. Captain R.N. Commander of the Polar Expedition." Mention here by Parry of "the Polar" expedition suggests the last arctic one of which he had command —the objective of which was indeed the North Pole,[13] whereas the others were concerned with finding a north-west passage from the Atlantic to the Pacific. Another point of interest is that alongside the "by" in this label is pencilled in brackets a faint "me"—again presumably by Parry and indicating that he, personally, had been the collector. Unfortunately no other labels or indications accompany the set, although it appears from this last-mentioned label that the other two are erroneous. They suggested as the venue Melville Island and/or the regions to the south that were visited during Parry's 'second' voyage.

There are only five specimens in this set, mounted on separate sheetlets of apparently the same paper as that used in the set described above as 'B' and the Manchester one described in Perl. II as 'C'—though unfortunately there is no sign of any watermark to confirm this. The rough cutting and sizes are also similar. The sheetlets are separated by pieces of tissue paper: this to me suggests, however vaguely, that there were never many of them between these stout and flat enclosing boards, and that the tissue paper was introduced as a precaution against crushing.

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[13] Parry, W. E. "Narrative of an attempt to reach the North Pole . . ." *London:* pp. xxiii + 229, maps and plates, 1828.

The following are the five specimens. As to where they came from it is again impossible to be sure, though there is a strong suggestion at least that one or two may have come from the Old World (most likely from Spitsbergen), as is already suggested by the label written by Parry and described last above. An arctic phytogeographer who ignored the labels and looked only at the plants (which indeed are not in any way attached to the labels) would almost certainly suggest Spitsbergen, even if he did not know that Parry had been there.

Salix polaris Wahlenb. *Fide* Eilif Dahl. In its entire leaves, hairy capsules, etc., this appears to be a typical specimen of this familiar Spitsbergen species which should yet be searched for on Melville Island where, however, the form most likely to occur is subsp. *pseudopolaris* (see Perl. II).

Polygonum viviparum L. Plentiful all over the Arctic, in both Old and New Worlds, and extending far south.

Saxifraga flagellaris Willd. ex Sternb. Occurs both in Spitsbergen and on Melville Island; nor can I see any difference between Old and New World arctic specimens which appear to exhibit a similar range ofvariation.

Potentilla cf. hyparctica Malte, vel hybr. *See* set 'B' (above). *P. hyparctica* is circumpolar in distribution and well known to occur and, apparently, hybridize promiscuously both in Spitsbergen and the Melville Island region.

Dryas cf. octopetala, subsp. punctata (Juz.) Hultén. Although the material is insufficient for certain determination, there seems very little room for doubt that it belongs to the familiar Spitsbergen etc. *D. octopetala* series rather than the somewhat comparably crenate-dentate leaved New World *D. integrifolia* f. *intermedia* (Nathorst) Polunin. Meanwhile *D. octopetala*, even if it is unknown from the whole of the Canadian Eastern Arctic,[4] should be searched for on Melville Island and elsewhere to the west, in spite of the contention of Simmons (*l. c.* p. 105) that it does not reach the American Arctic Archipelago and of my own remarks in Perl. I that it is "supposedly absent from all those parts of North America that lie between Greenland and the Rocky Mountains; indeed it was subsequently reported by Mr. A. E. Porsild (in *Sargentia*, IV, p. 50, 1943) from the near side of the Mackenzie River Delta, even though the same author later revised some at least of his determinations rather drastically (cf. *Canadian Field-Naturalist*, 61, pp. 191, 192, etc., 1947).—Gray Herbarium of Harvard University.

USES OF CELLULOSE ACETATE IN THE HERBARIUM

Norman C. Fassett

Cellulose acetate, mentioned several years ago as a base for mounting small seeds,[1] has been found increasingly useful in the preparation and care of mounted material. It is safe to use in the herbarium, since it lacks the highly inflammable property of cellulose nitrate. It can be procured inexpensively by boiling the emulsion from old X-ray film, or conveniently by purchase in large sheets.

Protection of herbarium sheets in the laboratory. Herbarium sheets that are to be used by classes may be protected from wear and breakage by being covered with a sheet of cellulose acetate. The acetate may be fastened to the sheet by stapling around the edges; the staple is less likely to break through the paper sheet if it is put through the back of the paper with the clamped ends folded over the acetate.

Picking stylus. The use of a stylus of cellulose acetate, to pick up small objects by static electricity, has already been noted.[2] It should perhaps be added that this procedure is more successful on a cold winter's day than when the humidity is high.

Reinforcement after mounting. A fairly stiff solution of cellulose acetate in acetone is an excellent substitute for gummed strips in reinforcing mounted material such as roots, petioles, twigs. With a needle, or dowel, or even a twig (but not a lacquered penholder or pencil) a line is dripped over the object; it will harden and adhere to paper and plant material. It will not adhere to a heavily cutinized material.

The drying time for a simple solution of acetate in acetone is but a few minutes or even seconds, rather than the 20 minutes described for the plastic mounting agent by Dr. Archer,[3] so it could probably not be used in the oil-can dispensers.

Mounting delicate plants. A very thin solution of cellulose acetate in acetone is used. Lay the plant (*Najas*, *Potamogeton*, *Callitriche*, etc.) on the sheet and apply the solution over the plant lightly with a brush. Enough will run under to fasten it, and the thin layer of acetate on plant and paper will be quite invisible when dry. Aquatics that have been floated out on paper before drying can thus be fastened down without being disturbed.

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[1] Rhodora **41**: 367. 1939.
[2] Rhodora **51**: 60. 1949.
[3] Rhodora **52**: 298. 1951.

Minor repairs. A bottle of cellulose acetate solution kept on the working table is useful for instant repair of small breakage of herbarium specimens. The solution is best spread directly on the paper, and a leaf or flower replaced while the solution is still wet. It dries and hardens in a minute or two, and is invisible if a thin solution is used.

Mounting small seeds or fruits. Small objects, such as seeds of *Euphorbia* or *Juncus,* removed from their fruits, are easily secured directly to the herbarium sheet with a drop of cellulose acetate solution; an arrow or other mark on the sheet locates them for the next user.

A better method is to mount them on pieces of acetate sheet, cut perhaps 1 x 2 inches, that may be kept in packets. Seeds of orchids, for example, are scattered on the acetate sheet and touched with a drop of acetone; the mount is permanent in a few seconds. In preparation of a monograph of *Callitriche,* the writer has recently found this method invaluable for making direct comparison of fruits from different collections. An acetate strip with fruits from one collection can be placed over a fruit on another herbarium sheet, and the two compared side by side under the binocular microscope. Some special techniques described for handling of *Callitriche* fruits[4] may be adapted for use in other groups.

Spores of *Isoetes* are easily secured to an acetate sheet with a drop of acetone, but they are brittle and will be broken if the sheet is placed in a packet. For their protection, small pieces of acetate, about one mm. wide and 5 mm. long, are built up log-cabin style about the spores, and secured in place with a drop of acetone. Further protection is assured by putting on a roof; a piece cut the right size is put on top and secured with acetone.

A dried flower that has been softened by boiling or by soaking in a "detergent" solution can be mounted permanently by spreading it on an acetate strip; it is flushed with alcohol for dehydration, then saturated with acetone.

Pressing delicate flowers. Corollas of *Eichornia*, for example,

[4] RHODORA 53: 141. 1951.

too often appear in the herbarium as colorless blobs. Both shape and color can be preserved by pressing individual flowers on an acetate sheet. The flower may be laid on a sheet of convenient size, or the corollas may be removed and laid out flat. After ordinary pressing, a quick wash with acetone fastens the dried flower to the acetate. The writer has not tried this on *Iris* but is confident that it would produce excellent preparations.

Millimeter scale. Lines a millimeter apart, scratched on a piece of cellulose acetate, produce a ruler that can be laid over the object to be measured. This type of rule is especially useful when close measurements are to be made under the binocular microscope. A machinist can engrave such lines down to 0.2 mm. apart.—Department of Botany, University of Wisconsin.

The Effect of Forced Aeration on the Longevity of Laminaria[1].—For some time investigators have been desirous of keeping Laminaria and other large marine algae alive in the laboratory for periods of several weeks. This desire, however, has been met with little or no success. In ordinary running sea water in the laboratory, the tissue of Laminaria and many other marine algae begins to slough off progressively within a few days. Usually after one week the plant is of no use.

The writer, while investigating epiphytism among marine algae, found it necessary to keep Laminaria alive in the laboratory for periods of several weeks. Some consideration of the problem revealed that species of Laminaria had been kept alive in the laboratory over a longer period of time by the addition of orange juice to sea water. In this report, however, it was not pointed out what elements of the orange juice were responsible for the longevity of Laminaria in the laboratory. The writer thought this method a little too expensive; therefore it was not tried.

Laminaria collected around Woods Hole, Massachusetts, is usually found attached to rocks or other substrates in areas where water is in rapid motion. As the result of this rapid motion, large amounts of gases are collected from the atmosphere. The writer felt that the difficulty in keeping Laminaria alive in the

[1] Paper presented at Marine Biological Laboratory, Woods Hole, Massachusetts.

laboratory might be overcome by more satisfactorily duplicating the natural environment of the plant.

With this in mind a 1/16 inch hole was drilled in the nozzle of a salt water faucet. This hole was drilled in a downward direction at an angle of about 22.5 degrees. To the faucet was attached a rubber tube which extended to the bottom of a 4,000 ml. beaker. The holdfasts of recently collected Laminaria were loosely but securely tied to rocks and placed in the beaker. The water was then allowed to run at full force throughout the experiment. Weekly cleaning of the beaker insured the maximum amount of light and periodic cleaning of faucets insured the maximum amount of force to produce aerated water movements. Air drawn in through the hole in the nozzle produced foam similar to that often observed in the natural environment of Laminaria. Air was drawn in with a much greater force through the hole in the nozzle than through hole in rubber tube; therefore the hole in the nozzle gave more desirable results.

During the summer of 1950, *Laminaria Agardhii* Kjellman was kept alive under the previously described conditions for a period of ten weeks with a minimum amount of sloughing off. A small amount of sloughing off could be expected since this normally takes place under natural environmental conditions as the plant grows older. At the end of ten weeks these plants were dried and they are now in the herbarium of the writer. This experiment was repeated for six weeks during the summer of 1951 and the results closely approximated that of 1950.—JOHN W. KING, MORGAN STATE COLLEGE, BALTIMORE, MARYLAND.

A FURTHER NOTE ON THE PLANTS OF VINLAND THE GOOD.—In reference to the interesting article on "The Identity of Vinber and Vinland," by Jacques Rousseau in RHODORA **53**: 244, 245, 1951, it may be of interest to call attention to the publication on Newfoundland-Labrador by V. Tanner, issued by the Cambridge University Press in 1947. On page 43 of the first volume, Tanner has a great deal to say about the early explorations in Labrador, particularly about the Norse discoveries, and his map shows the locations of the various Norse localities as understood by him. According to Tanner, "mark" was old Norse for "wood" and referred to wooded parts of the Atlantic Coast of Labrador.

"Vinland" according to the same author, had nothing to do with either wine or grapes but came from an early Norse word "vin," signifying grassland or pasture suitable for cattle. Vinland is located by Tanner in the northern part of the Long Range Peninsula of Newfoundland. "Vinber" would be the berries from the pasture land. Many controversial attempts have been made to locate these various localities, visited by the Norsemen about the year 1000. Tanner, at any rate, has a first hand knowledge of the Labrador coast.

Since the foregoing notes were written, I have received from the eminent Icelandic botanist, Dr. Áskell Löve, a reprint of his "Plants of Vineland the Good," recently published in the Icelandic Canadian, vol. 10, no. *2*: 15–22. 1951. Dr. Löve feels that the modern Scandinavian languages have very little value in the identification of the plants of the Norse voyages, with the exception of modern Icelandic which has changed very little from that of a thousand years ago. He mentions Rousseau's contribution and takes up in detail the question of the identity of "*Mosurr wood*," "*self-sown wheat*" and "*vinber*." He agrees with the conclusions of Fernald that the Mosurr wood is probably the canoe birch (*Betula papyrifera*); but does not agree that the self-sown wheat is *Elymus*, which would have been very well known to the travelers from Greenland, but thinks that it is the wild rice (*Zizania aquatica*). The "vinber," Löve believes to be some species of grape. Currants were never known as wine berries in Iceland, and Löve points out that the grape and the "plant which bears the grape" are clearly differentiated in the present Icelandic language just as they were at the time of the Sagas. Geographic distribution of these plants, taken together with the mild climate and the relatively long days of mid-winter would place the Norse expeditions far to the south of Labrador. Dr. Löve thinks that a team of scientists "should visit Cape Cod for the purpose of trying to dig some of the remains of the first white settlement on the American mainland."

It is clear from the citations in these recent articles that the location of the Norse settlements and the identity of the plants involved are by no means settled. Who will be next?—HENRY K. SVENSON, THE AMERICAN MUSEUM OF NATURAL HISTORY, NEW YORK.

ANTENNARIA ROSEA GREENE IN THE LAKE SUPERIOR REGION.—While making a preliminary survey of the genus *Antennaria*, as it is represented in the Upper Peninsula of Michigan, this writer came upon two collections of this genus that are strikingly different from any species thus far known to occur in the state; these specimens are deposited in the Beal-Darlington Herbarium of Michigan State College. Both specimens were collected by Herma A. Baggley—one on July 3, 1940 and the other on May 25, 1941—on Caribou Island, a small island off the main body of Isle Royale. Mrs. Baggley had identified one of the specimens as *Antennaria rosea* and made the following comment on the other: "Very similar to *Antennaria rosea* of Yellowstone. Bracts a rose-pink."

After studying these unusual plants the writer, too, is convinced that they are *Antennaria rosea* Greene, the previous easternmost record for which appears to be in the Black Hills of South Dakota more than eight hundred miles west-southwest of Isle Royale. To verify the opinions of Mrs. Baggley and the writer, one of the plants was sent to Dr. S. F. Blake of the U. S. Department of Agriculture for his expert opinion. Dr. Blake's reply is as follows: "The *Antennaria* collected by Mrs. Baggley on Caribou Island, Michigan, seems to be definitely *A. rosea* Greene."

The writer has made a further study of the specimens of *Antennaria* from the Lake Superior region as represented in the Herbarium of the University of Michigan and the Herbarium of the Canadian Department of Agriculture, Ottawa, Canada. A specimen from the latter herbarium, collected at Fort William, Lake Superior by I. K. McMorine in June 1879 has also been determined by the writer to be *Antennaria rosea* Greene. Fort William is situated on the Ontario shore of Lake Superior approximately thirty miles northwest of Isle Royale and almost the same distance north-northeast from the Minnesota-Ontario boundary.

The three collections discussed above are evidence that *Antennaria rosea* Greene occurs, although perhaps only locally, in the Lake Superior region and well within the range limits of edition eight of Gray's Manual. The range of this species thus extends much farther eastward than has been reported in any previous publication.—PETER A. HYYPIO. MICHIGAN STATE COLLEGE, EAST LANSING, MICHIGAN.

The White Form of the Fringed Polygala in New Hampshire.—Mr. R. J. Eaton in a recent issue of Rhodora (Rhodora **54**: 27–28. 1952) has noted that the color forms of the fringed *Polygala* are rare. The blue flowered form, *Polygala paucifolia* Willd., forma *caerulea* Eaton, is known from a single locality. The white flowered form, *P. paucifolia* Willd., forma *alba* Wheelock, is represented in the Gray Herbarium and the New England Botanical Club by three collections, from Concord and Sherborne, Massachusetts, and from Bangor, Maine.

Mr. Edgar Keen of Warner, New Hampshire, recently sent to the author specimens of *P. paucifolia* f. *alba* which represent the first record of that color form from New Hampshire. The plants were first observed in flower on May 18th. and were recollected in flower on June 1, 1952. Mr. Keen reports there were a dozen plants in about one square yard with a few more plants located a few yards away. They were growing amid the typical pink flowered plants in a mixed growth of hardwood and evergreen on an eastern slope. The earlier collection was made from plants growing near an opening made for a road.

This new record of *P. paucifolia* f. *alba*, from Warner, New Hampshire, is an interesting addition to the known distribution of this attractive plant.—Richard A. Howard. GRAY HERBARIUM, HARVARD UNIVERSITY.

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no. 490: 50c
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Vol. 46, no. 542: 50c
no. 544: 60c
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Vol. 46, no. 547: 50c
no. 548: 45c
no. 550: 55c
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no. 552: 50c
Vol. 47, no. 553: 75c
no. 554: 50c
no. 555: 60c
no. 556: 75c
no. 557: 75c
no. 558: 50c
no. 559: 75c
no. 560: 60c
no. 562: 85c
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no. 567: 50c
no. 568: 60c
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no. 570: 50c
no. 571: 60c
no. 572: 50c
no. 573: 70c
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no. 575: 70c
no. 576: 50c
Vol. 49, no. 577: 50c
no. 578: 60c
no. 580: 60c
no. 581: 70c
no. 582: 80c
no. 583: 75c
no. 587: 50c
no. 588: 50c
Vol. 50, no. 589: 45c
no. 590: 60c
no. 591: 40c
no. 592: 60c
no. 593: 60c
no. 594: 40c
no. 595: 75c
no. 596: 85c
no. 597: 55c
no. 598: 40c
no. 599: 60c
no. 600: 65c
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no. 604: 85c
no. 609: 75c
no. 610: 70c
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